

19. (Previously Amended) A method for producing a digital data set representing a final tooth arrangement, said method comprising:
providing an initial digital data set representing an initial tooth arrangement;
presenting a visual image based on the initial data set;
manipulating the visual image to reposition individual teeth in the visual image;
producing a final digital data set representing the final tooth arrangement with repositioned teeth as observed in the image; and
producing a plurality of intermediate digital data sets representing a series of successive tooth arrangements progressing from the initial tooth arrangement to the final tooth arrangement.

20. (As filed) A method as in claim 19, wherein the step of providing a digital data set representing an initial tooth arrangement comprises scanning a three-dimensional model of a patient's teeth.

21. (As filed) A method as in claim 20, wherein the manipulating step comprises:
defining boundaries about at least some of the individual teeth; and
moving at least some of the tooth boundaries relative to the other teeth in an image based on the digital data set.

22. (Twice Amended) A method for producing a plurality of digital data sets representing a series of discrete tooth arrangements progressing from an initial to a final arrangement, said method comprising:
providing a computer system having at least one processor and memory;
providing to the computer system an initial [a] digital data set representing an initial tooth arrangement;
providing to the computer system a final digital data set representing a final tooth arrangement;
producing using the computer system a plurality of successive digital data sets based on both of the previously provided initial and final digital data sets, wherein said plurality of successive digital data sets represents a series of successive tooth arrangements progressing from the initial tooth arrangement to the final tooth arrangement.

23. (As filed) A method as in claim 22, wherein the step of providing a digital data set representing an initial tooth arrangement comprises scanning a three-dimensional model of a patient's teeth.

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1 ⁶24. (Twice Amended) A method as in claim ⁴22, wherein the step of
2 providing a digital data set representing a final tooth arrangement comprises:
3 defining boundaries about at least some of the individual teeth on a visual image
4 provided by the computer system; and
5 moving at least some of the tooth boundaries relative to the other teeth in the
6 visual image **[based]** to produce the final data set.

1 ⁷25. (As filed) A method as in claim ⁴22, wherein the step of producing a plurality of
2 successive digital data sets comprises determining positional differences between the initial data set and the final
3 data set and interpolating said differences.

1 ⁸26. (As filed) A method as in claim ⁷25, wherein the interpolating step comprises linear
2 interpolation.

1 ⁹27. (As filed) A method as in claim ⁷25, wherein the interpolating step comprises non-
2 linear interpolation.

1 ¹⁰28. (As filed) A method as in claim ⁷25, further comprising defining one or more key
2 frames between the initial tooth arrangement and final tooth arrangement and interpolating between the key
3 frames.

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1 ¹¹29. (Twice Amended) A method for fabricating a plurality of dental
2 incremental position adjustment appliances, said method comprising:
3 providing an initial [a] digital data set representing an initial tooth arrangement;
4 providing a final digital data set representing a final tooth arrangement;
5 producing a plurality of successive digital data sets based on both of the
6 previously provided initial and final digital data sets, wherein said plurality of digital data sets
7 represent a series of successive tooth arrangements progressing from the initial tooth
8 arrangement to the final tooth arrangement; and
9 fabricating appliances based on at least some of the produced digital data sets.

1 ¹²30. (As filed) A method as in claim ¹¹29, wherein the step of providing a digital data set
2 representing an initial tooth arrangement comprises scanning a three-dimensional model of a patient's teeth.

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1 ¹³31. (As filed) A method as in claim ¹¹29, wherein the step of providing a digital data set
2 representing a final tooth arrangement comprises:
3 defining boundaries about at least some of the individual teeth; and
4 moving at least some of the tooth boundaries relative to the other teeth in an image based on the
5 digital data set to produce the final data set.

1 ¹⁴32. (As filed) A method as in claim ¹¹29, wherein the step of producing a plurality of
2 successive digital data sets comprises determining positional differences between the initial data set and the final
3 data set and interpolating said differences.

1 ¹⁵33. (As filed) A method as in claim ¹⁴32, wherein the interpolating step comprises linear
2 interpolation.

1 ¹⁶34. (As filed) A method as in claim ¹⁴32, wherein the interpolating step comprises non-
2 linear interpolation.

1 ¹⁷35. (As filed) A method as in claim ¹⁴32, further comprising defining one or more key
2 frames between the initial tooth arrangement and final tooth arrangement and interpolating between the key
3 frames.

1 ¹⁸36. (As filed) A method as in claim ¹¹29, wherein the fabricating step comprises:
2 controlling a fabrication machine based on the successive digital data sets to produce successive
3 positive models of the successive tooth arrangements; and
4 producing the dental appliance as a negative of the positive model.

1 ¹⁹37. (As filed) A method as in claim ¹⁸36, wherein the controlling step comprises:
2 providing a volume of non-hardened polymeric resin; and
3 scanning a laser to selectively harden the resin in a shape based on the digital data set to produce
4 the positive model.

1 ²⁰38. (As filed) A method as in claim ¹⁸36, wherein the producing step comprises modeling
2 the appliance over the positive model.

1 ²¹39. (As filed) A method for fabricating a dental appliance, said method comprising:
2 providing a digital data set representing a modified tooth arrangement for a patient;
3 controlling a fabrication machine based on the digital data set to produce a positive model of the
4 modified tooth arrangement; and

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5 producing the dental appliance as a negative of the positive model.

1 ²²40. (As filed) A method as in claim ²¹39, wherein the controlling step comprises:
2 providing a volume of non-hardened polymeric resin;
3 scanning a laser to selectively harden the resin in a shape based on the digital data set to produce
4 the positive model.

1 ²³41. (As filed) A method as in claim ²¹39, wherein the producing step comprises molding the
2 appliance over the positive model.

1 ²⁴42. (As filed) A method for fabricating a dental appliance, said method comprising:
2 providing a first digital data set representing a modified tooth arrangement for a patient;
3 producing a second digital data set from the first data set, wherein the second data set represents
4 a negative model of the modified tooth arrangement; and
5 controlling a fabrication machine based on the second digital data set to produce the dental
6 appliance.

1 ²⁵43. (As filed) A method as in claim ²⁴42, wherein the controlling step comprises selectively
2 hardening a non-hardened resin to produce the appliance and separating the appliance from the remaining liquid
3 resin.

1 ²⁶44. (As filed) A method as in claim ²⁴42, wherein the appliance comprises a polymeric shell
2 having a cavity shaped to receive and resiliently reposition teeth from an initial tooth arrangement to the modified
3 tooth arrangement.

REMARKS

Claims 19-44 were examined. Applicants gratefully acknowledge the allowance of claims 19-21, and 39-44, as well as the indicated allowability of claims 36-38. The claims have been amended as noted above. Reexamination and reconsideration of the claims, as amended, are respectfully requested.

Applicants thank Examiner Wilson for the courteous and helpful interview held on November 29, 2000. Pursuant to a subsequent telephone message, Applicants have amended claim 22 to recite that the computer system has "at least one processor and memory" to overcome the §101 rejection. The specification has been similarly amended to conform to the claim. With these amendments, it is believed that the §101 rejection has been overcome.

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